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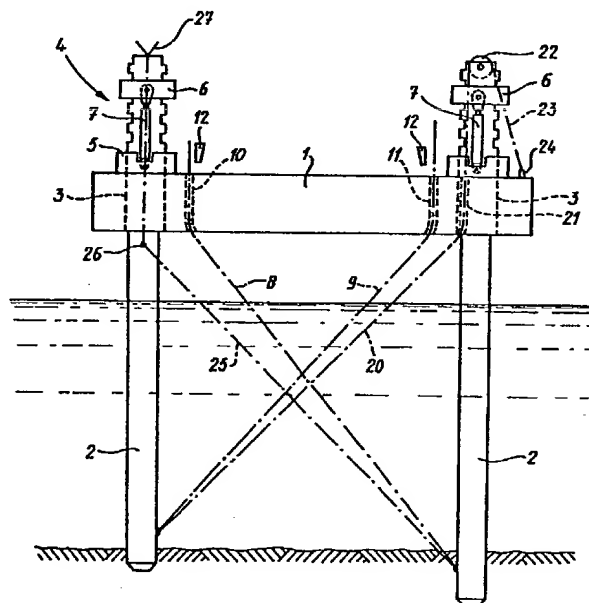
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Selected US specifications from IPC sub-class B63B

(54) Jack up island

(57) A jack-up island having a platform 1 with buoyancy and at least three columns 2 which are removable and lockable in vertical direction with respect to the platform, said island being strengthened by means of tension members 8,9 or 20,25 which from the lower part of each column extend to a next column on both circumferential directions and at said next column or adjacent to said column are fixed to the column or to the platform and are tensioned. This tensioning can be achieved by a relative displacement of the platform with respect to the columns.

fig -1



GB 2 175 257 A

fig-1

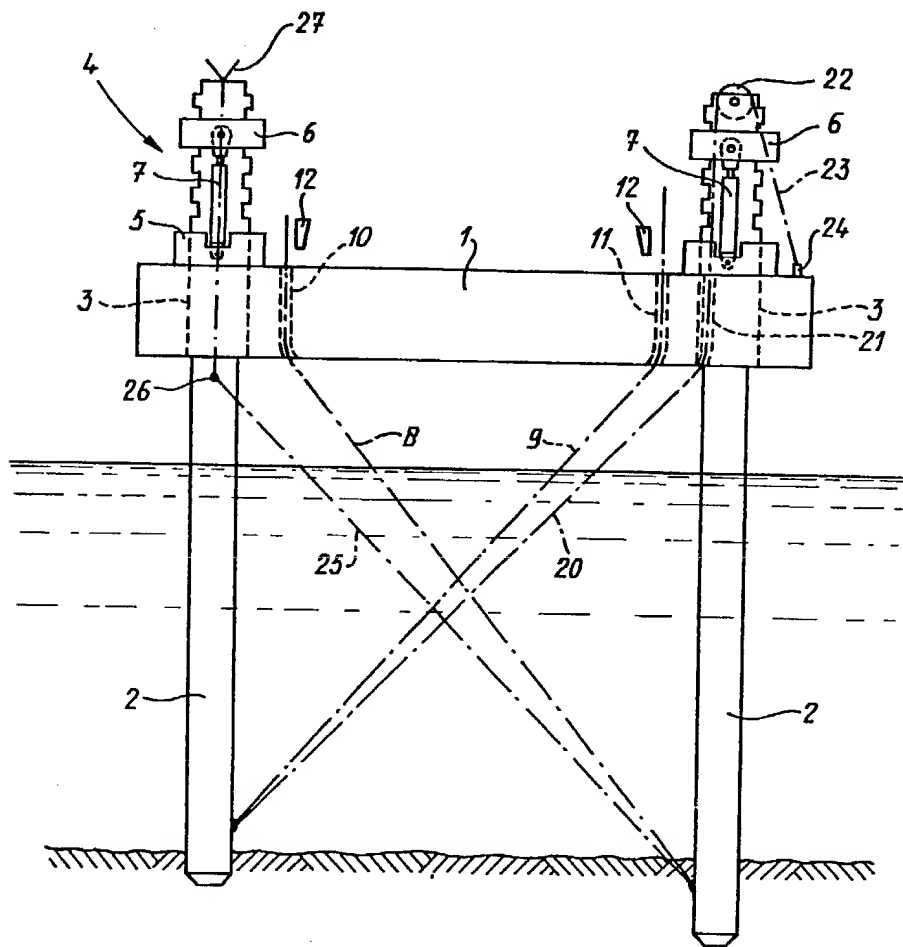


fig-2

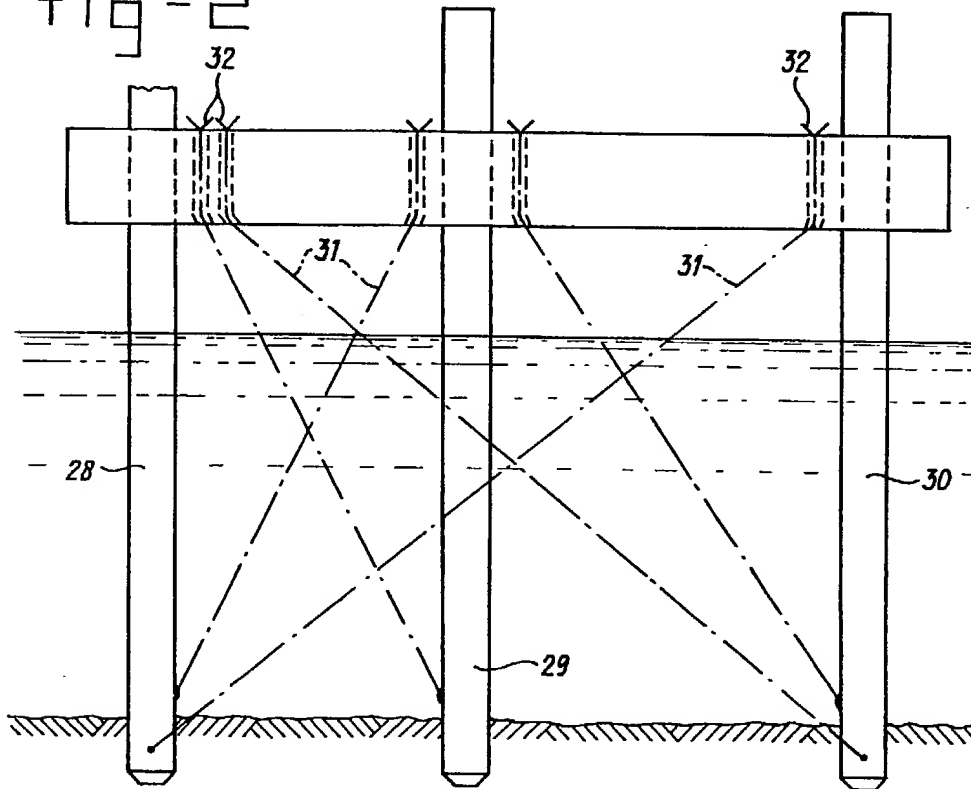
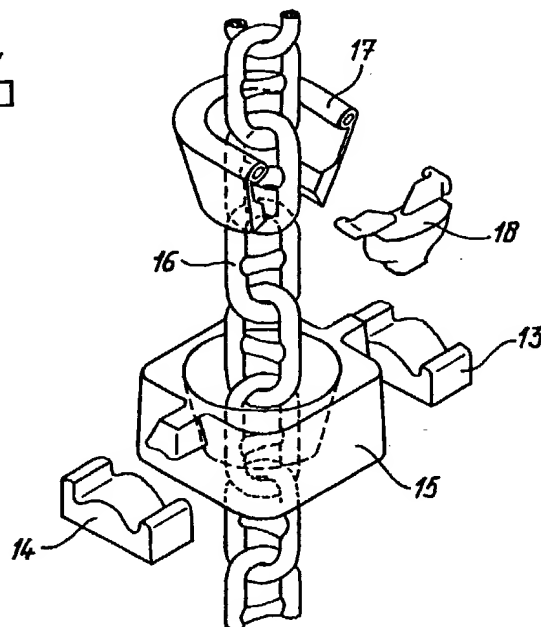


fig-3



SPECIFICATION

Jack up island

- 5 The invention relates to a jack up island comprising a platform having buoyancy (pontoon) and with at least three columns, which platform and columns are movable in respect of each other in vertical direction inside guides of the platform and cooperate with a lifting mechanism at each column by means of which each column independent of the others is movable and lockable.

- Jack up islands of this type are generally known in many embodiments. Usually they are designed such that they are adapted to the working circumstances in the area of operation for which the island is meant. This means that heavy embodiments and light embodiments are known of this type of jack up island. Said jack up islands have at least three columns but there exist islands as well having four, five, six and even eight columns.

- The problem which may occur with such jack up islands is that an island of relatively light construction has to be made useful for more heavy working circumstances for which normally a jack up island of heavier construction would have to be used. With the present constructions this is not possible and the aim of the invention is to find for this a very simple solution which enables the application of jack up islands of a light construction at locations for which normally a much heavier construction would have to be applied. The invention also aims at adapting existing jack up islands in a simple manner for heavier circumstances.

- Circumstances which can increase the load on the jack up island are formed by the weather conditions and the wave forces and wind forces resulting from it which generate bending loads of the columns.

- Of still larger importance is the depth of the water which in combination with a relatively light construction of the column leads to a construction of the jack up island with higher therewith often undesired own swinging periods which too close approach the wave periods.

- The aim of the invention now is achieved in that the lower part of two or more columns has been connected with a fixed point of the island by means of a tension resistant connection said point being located at the level of the platform and upon or adjacent the subsequent columns in both circumferential directions. According to the invention a cross connection is created in each side plane of the island having columns. The transverse forces occurring therewith at the location of the lower part of the columns are taken up in that each column of this type of jack up island has been pressed into the sea bottom as far as possible, whereas the transverse forces resulting from the cross link connection in the plane of each cross link at the level of the platform reduce the bending moment at said location, so that the resulting moment curve along the vertical longitudinal axis of each column is reduced considerably.

- Cross links are known in itself with jack up island, e.g. from the European patent 0 053 861, however,

- this deals with a jack up island in which the supporting construction and the platform although movable and lockable with respect to each other in vertical direction have a supporting construction comprising of columns which at half height are rigidly interconnected by a horizontal connection with cross connections being added to said connection, comprising rods or cables.

- A similar construction is found as well in the published Dutch patent application 7201658 according to which the lower parts of the supporting construction are interconnected as well.

- With the invention one however achieves that with jack up islands with independently movable columns, which may have accordingly different depths of penetration, one can reduce the bending loads on said columns considerably. One therewith achieves of course as well that a certain jack up island then becomes suitable for heavier circumstances which not only need to be formed by heavier weather conditions but also can relate to e.g. larger depth and therewith greater length of the columns.

- The tension resistant connection may be realized in different ways. Thus it is possible according to the invention that the tension resistant connection is immediately connected to the upper part of the platform. In this case the tension resistant connection will be guided through an opening of the platform and fixed to the upper deck. The force in said tension resistant connection then loads the locking members between the platform and column.

- According to the invention it is possible as well that the tension resistant connection through a guide extends over the respective column parts which extend above the platform and are connected with the platform by means of the portion which extends downwardly from said guides. This solution is more complicated but the locking members then are unloaded.

- In both above mentioned cases the tension resistant connections can be tensioned in that after connection and straightening the platform and columns are moved with respect to each other in vertical direction. In the first case this is obtained by moving the platform a little bit upwardly and in the second case by moving it a little bit downwardly.

- A third possibility exists in that the tension resistant connections at the level of the platform are directly connected with the column. Such a connection to the columns can be below the platform but also through guides of each column can have a more accessible connecting member which the column above deck.

- The tension resistant connecting members may comprise cables which are locked by means of cable clamps or, at least in the upper part, are formed by a chain which is locked by means of a chain stopper.

- Not only new jack up islands can be provided with the means according to the invention, also existing jack up islands in a simple manner can obtain increased rigidity and strength in that the lower part of each column in both circumferential directions of the island under tension is connected by means of tension members, such as cables or chains with a fixed point of the upper part of the island at the location of a column which in circumferential

direction follows in the same side plane.

The invention now will be further elucidated with reference to the drawings.

Figure 1 shows schematically in side view on one side of a jack up island in which three connecting possibilities for the tension members are shown.

Figure 2 shows another possibility for a jack up island having six columns.

Figure 3 shows in perspective view a chain stopper known in itself.

The jack up island shown in figure 1 comprises a pontoon 1 with columns 2 two of which are shown only. It deals, however, with an island having four legs two of which accordingly are shown in side view and two cannot be seen. Such an island, seen in circumferential direction, has four sides. Each column 2 is guided in an opening 3 of the pontoon 1. On deck a climbing and locking mechanism indicated in general with 4 and having in the lower part 5 locking members which can be put into and out of operation which lower part has been mounted upon the deck, locking members which can be put into and out of operation in the upper part 6 and inbetween a set of pressure cylinders 7.

The first possibility for increasing the strength and rigidity has been indicated with the chains 8 and 9 respectively which extends obliquely upwardly from the lower ends of each column 2 towards guiding sleeves 10 and 11 respectively in the pontoon and which on deck of the pontoon 1 are locked by means of a chain stopper 12 shown unengaged.

Said chain stopper is shown in Figure 3 and comprises supports 13 and 14 placed on deck, which are adjustable in height and within which a cap 15 can rest having a central conically shaped opening for guiding the chain 16 there through which chain can be locked by means of the stopper 17 with wedge 18. Such a chain stopper is known in itself.

With said embodiment the chains 8 and 9 can be tensioned with a special tension mechanism or by moving the platform 1 a little bit upwardly with respect to the legs 2. The tensions in the chains 8 and 9 then will generate transverse forces at the location of the lower ends of the columns 2 and at the location of the upper ends.

In the other planes which are not shown similar chains extend.

The second possibility of connection is shown with the line 20 and is formed by a cable which extends through a guiding sleeve 21 and over a reversing wheel 22 present upon the upper end of the column and from there downwardly as indicated at 23 and at 24 into a clamp.

Whereas tensioning of the claims 8 and 9 with the first embodiment has a result that the locking members in part 5 are additionally loaded, the embodiment with cables which extend over reversing discs at the upper end of the columns will perform the reverse because the tension force in said cables 20 at the location of the connection 24 is directed opposite to the force of gravity of the pontoon.

A third possibility is indicated diagrammatically with the line 25 and comprises that the cable or chain extends from the lower end of a column towards the

upper end of another column in the same side plane and is connected there as shown at 26. In case the connecting point 26 is located unsuitably then of course the cable 25 can extend upwardly towards the upper end of column 2 and can be locked there as shown at 27.

With the embodiment of Figure 2 an island is meant having six columns three of which being shown in side view indicated with 28, 29 and 30. The jack up mechanism is not shown but can be of the same type as shown in Figure 1.

The connections of the tension members may be according to one of the types explained with reference to Figure 1.

Figure 2 only serves to show that in case of more than two columns in one side plane of the jack up island the tension members not only may extend from the lower end of one column towards the area of the upper part of the next column, as e.g. 28 towards the upper area 29, but also may extend towards the upper area of the subsequent column 30, along side the intermediate column 29. This in a simple way can be achieved by attaching said tension member to the outer side of e.g. column 28 and to locate the connection at the platform e.g. at 32 such with respect to columns 29 and 30 that the tension member 31, e.g. a cable, may move past the cable 29 without exerting forces thereon.

95 CLAIMS

1. Jack up island comprising a platform having buoyancy (pontoon) and with at least three columns, which platform and columns are movable in respect of each other in vertical direction inside guides of the platform and cooperate with a lifting mechanism at each column by means of which each column independent of the others is movable and lockable, *characterized in that* the lower part of two or more columns has been connected with a fixed point of the island by means of a tension resistant connection said point being located at the level of the platform and upon or adjacent the subsequent columns in both circumferential directions.

2. Island as claimed in claim 1, *characterized in that* the tension resistant connections are directly connected to the upper part of the platform.

3. Island as claimed in claim 1, *characterized in that* the tension resistant connections through a guide extend over the respective column portions which extend above the platform and are connected with the platform with that portion of the connections which from said guide extend downwardly.

4. Island as claimed in claim 1, *characterized in that* the tension resistant connections at the level of the platform are directly connected with the column.

5. Island as claimed in one or more of the preceding claims, *characterized in that* the tension resistant connections are formed by cables and/or chains and the connection with the fixed point takes place by means of a cable clamp or chain stopper.

6. Island as claimed in one or more of the preceding claims, *characterized in that* the tension resistant connections are under pretension.

7. Method for increasing the rigidity and strength

of an existing jack up island of the type comprising a pontoon and at least three columns movable with respect to the pontoon and lockable by means of a jack up mechanism, *characterized in that*, the lower
5 part of each column in both circumferential directions of the island is connected under tension by means of tension members such as cables or chains with with a fixed point of the upper part of the island at the location of a column which in circumferential
10 direction follows in the same side plan by means of tension members such as cables or chains.

8. Method as claimed in claim 7, *characterized in that* the tension members are tensioned by moving the platform with respect to the column after the
15 tension members being connected and straightened.

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